



## Lesson 9. Equalization (EQ)

The human ear can detect only a limited range of frequencies, with a maximum range from about 20 Hz to 20,000 Hz. The extreme ends of this range tend to decrease with age (at the age of 38, my supersonic range started around 17.5kHz.) Sounds below this range are called **subsonic**, or too low to hear; sounds above it are **supersonic**, or too high to hear.

Source: [hyperbits.com/eq-cheat-sheet](http://hyperbits.com/eq-cheat-sheet)

### **Sub Bass (0 - 60 Hz)**

“Rumble”

Sounds in this range are more felt than heard. Rumble should come from only one source (i.e. the bass) if you have it at all.

### **Bass (60 - 250 Hz)**

“Bottom”

This makes the track sound full. The kick drum and bass are in this range.

### **Low-Mid (250 - 500 Hz)**

“Boom / Warmth / Mud”

This covers the range of the bass clef staff and is therefore the power range for bass guitars and drums.

### **Mid-Range (500 - 2000 Hz)**

“Honk / Tinny”

The presence of most wind instruments is in this range (even instruments that play in the bass clef resonate with overtones in this range.)

### **High-Mid (2000 - 6000 Hz)**

“Crunch / Presence”

Percussion instrument attacks are most audible in this range. This is also the most easily audible to the human ear, so over boosting this range can produce fatigue.

### **High (6000 - 20,000 Hz)**

“Definition/Air”

This range is responsible for livening up the sound so that it “cuts.” If over boosted, this range will cause fatigue and a shrill tone.



When mixing, the process of **equalization** (or **EQ**) allows you to determine the relative levels of different bands of the frequency spectrum.

On most analog mixers, like our **Mackie 1604-VLZ3**, the equalization is controlled by a series of dials.

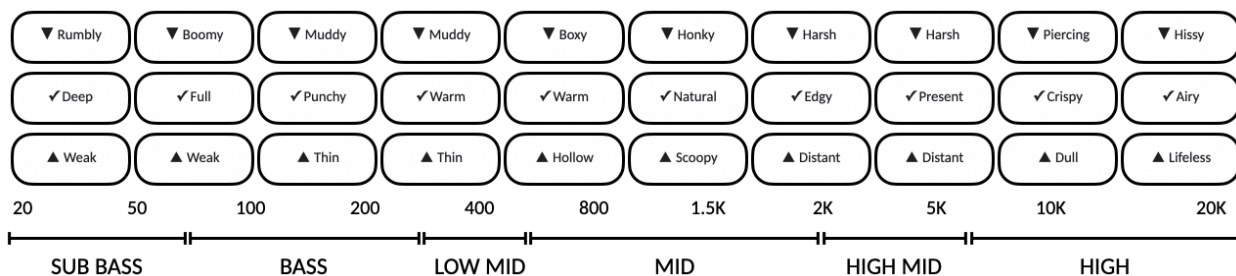
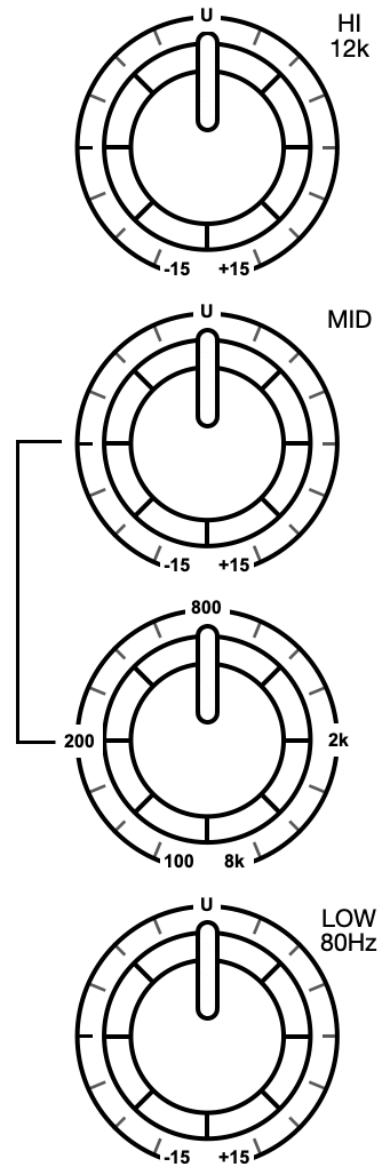
The top dial controls how much sound the speakers will produce above 12,000 kHz. Turning this up can help sound cut through, and turning it down can darken the tone. The sound will be shrill or piercing if turned up too high.

The lowest range, below 80Hz, is controlled by the bottom dial. Turning this up can add depth and profundity to a tone, and turning it down can add clarity. The sound will be “boomy” and unclear if turned up too high.

The two center dials get most of the action. Just like the top and bottom dials, the top middle dial (labelled “MID”) determines how much sound is allowed through the speakers; the frequency range that this dial controls is set by the dial underneath it.

The aim here is to amplify or reduce the overtones of the fundamental tone being played. Adjusting too close to the fundamental frequency itself will have the same effect as simply turning the fader up or down. The range of the first, second, and third harmonics, on the other hand, will have a significant impact on tone and timbre.

For EQing specific instruments, the frequency band where the instrument actually plays is source of “mud” or a lack of clarity; this should not be set too high. Presence on the instrument is generally from the first through fourth overtones.





### Auxiliary Sends

The four dials above the EQ settings send the audio signal to one of six other devices. These devices are plugged into the back of the mixer using a TRS cable where it says “Aux Sends.”

These are useful for creating stereo sound, setting up a “monitor” speaker for the performers to hear themselves, or creating an echo chamber for reverb effects.

The “5/6 Shift” button somewhat intuitively switches the third and fourth dials from controlling Aux Sends 3 and 4 to controlling Aux Sends 5 and 6.

